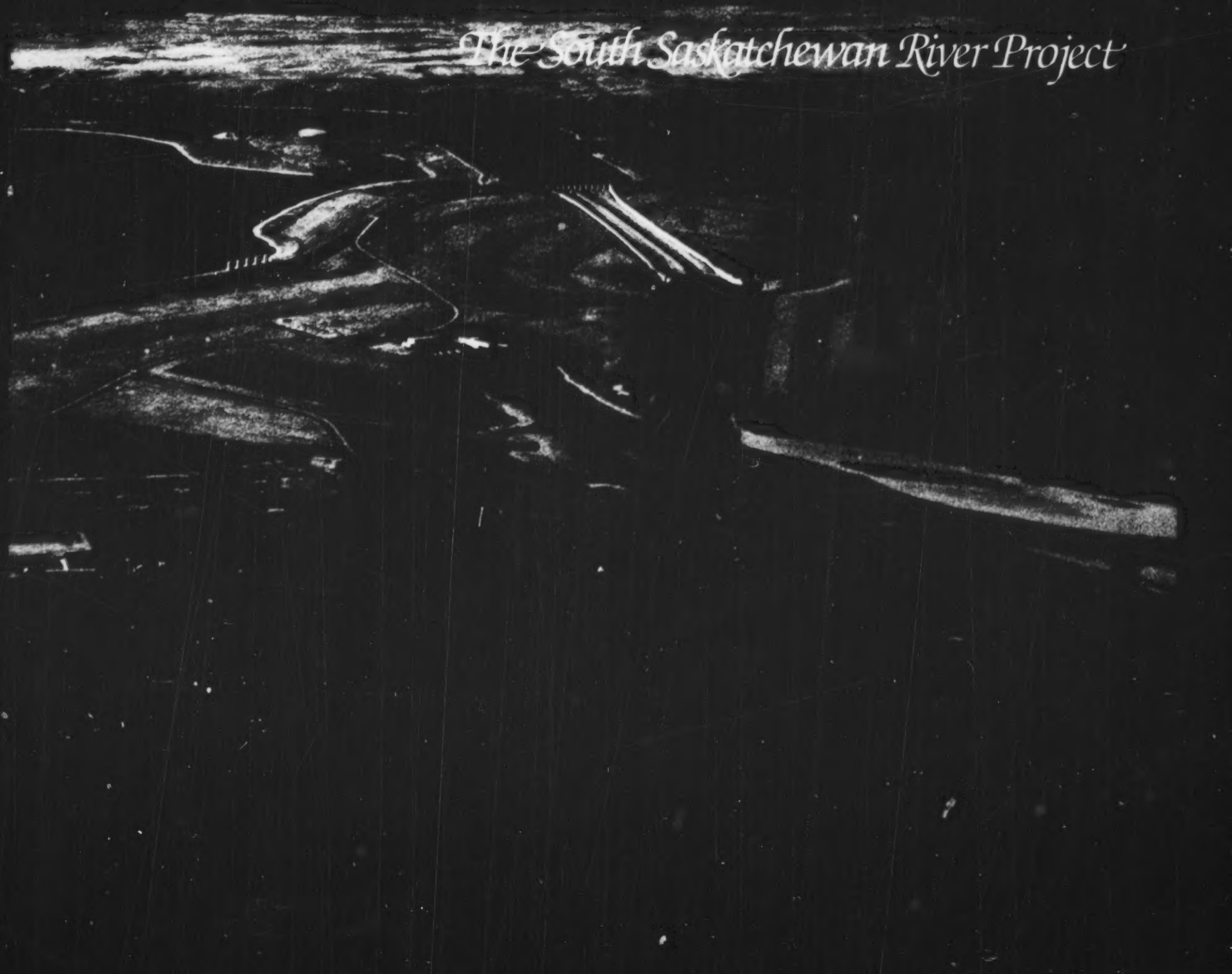
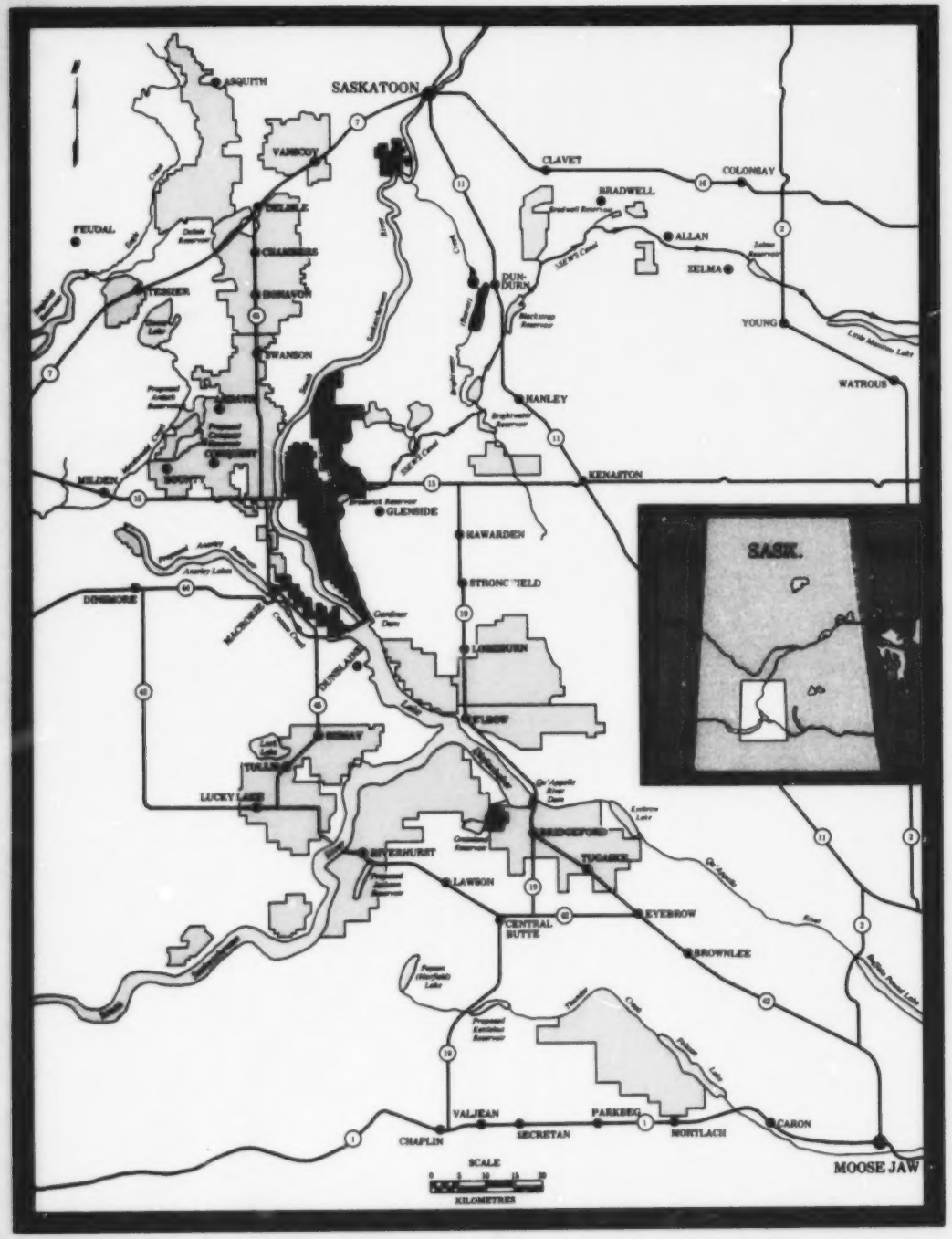
The South Saskatchewan River Project





Main Irrigation Blocks
South Saskatchewan River Project

Legend

areas under irrigation or being developed	33 000 hectares
potential areas for future development	149 000 hectares

The untapped resource

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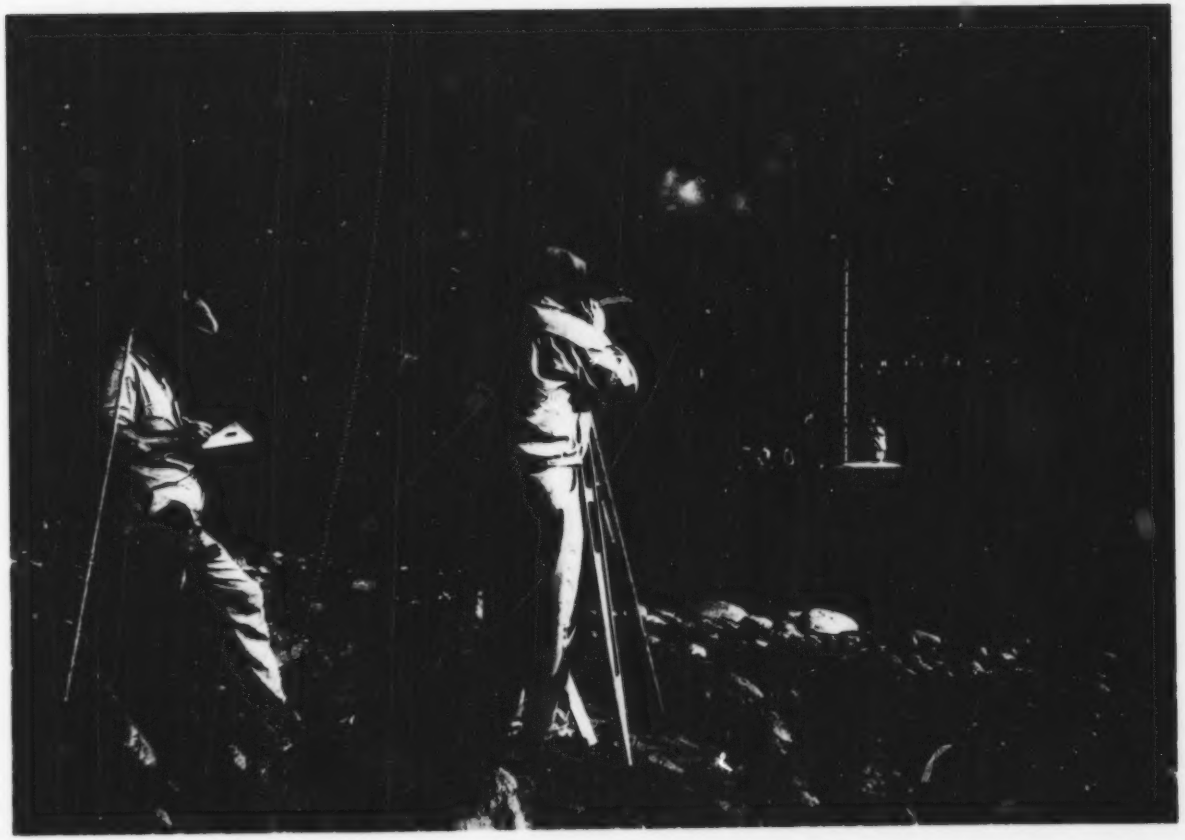

1) Less than one per cent of the water that flowed through Saskatchewan in the South Saskatchewan River was used before the South Saskatchewan River Project was completed.

Water is a precious commodity in semi-arid southern Saskatchewan. Most of the creeks and rivers in this region flow for a brief period each spring when the snow melts, then dry up. By late June, water becomes scarce. In drought years, even spring runoff may fail to materialize.

The South Saskatchewan River flows through this area, carrying more water than all the other rivers south of the North Saskatchewan River combined.

Originating in the Rocky Mountains, the South Saskatchewan River is a combination of three mountain streams, the Red Deer, Bow and Oldman Rivers. After supplying water to many communities, and vast irrigation projects in southern Alberta, the Bow and Oldman Rivers join upstream of the Alberta-Saskatchewan boundary to form the South Saskatchewan River. A few miles east of this provincial boundary the Red Deer River adds its water.

Once in Saskatchewan the river meanders east to the Town of Elbow. In glacial times the water continued to flow east into the Qu'Appelle valley on its route to Lake Agassiz, which covered much of central Manitoba. During the retreat of the glaciers, a channel to the north opened and the river changed its course to follow the northward slope of the land from Elbow to join the North Saskatchewan River east of Prince Albert and become the Saskatchewan River.

Except for the period prior to the arrival of the railways, when the river was a transportation route, very little use was made of this major river system.

Before the South Saskatchewan River Project, small irrigation projects and domestic and municipal water users along the South Saskatchewan River in Saskatchewan used less than one per cent of the annual average 8.4 billion cubic metres of water that flowed down the river each year. This vast renewable resource of good quality water flowed through the parched prairie of southern Saskatchewan virtually untapped until the South Saskatchewan River Project was completed in 1967.

2) The South Saskatchewan River originates in the Rocky Mountains and is a combination of three mountain streams, the Red Deer, Bow and Oldman Rivers.

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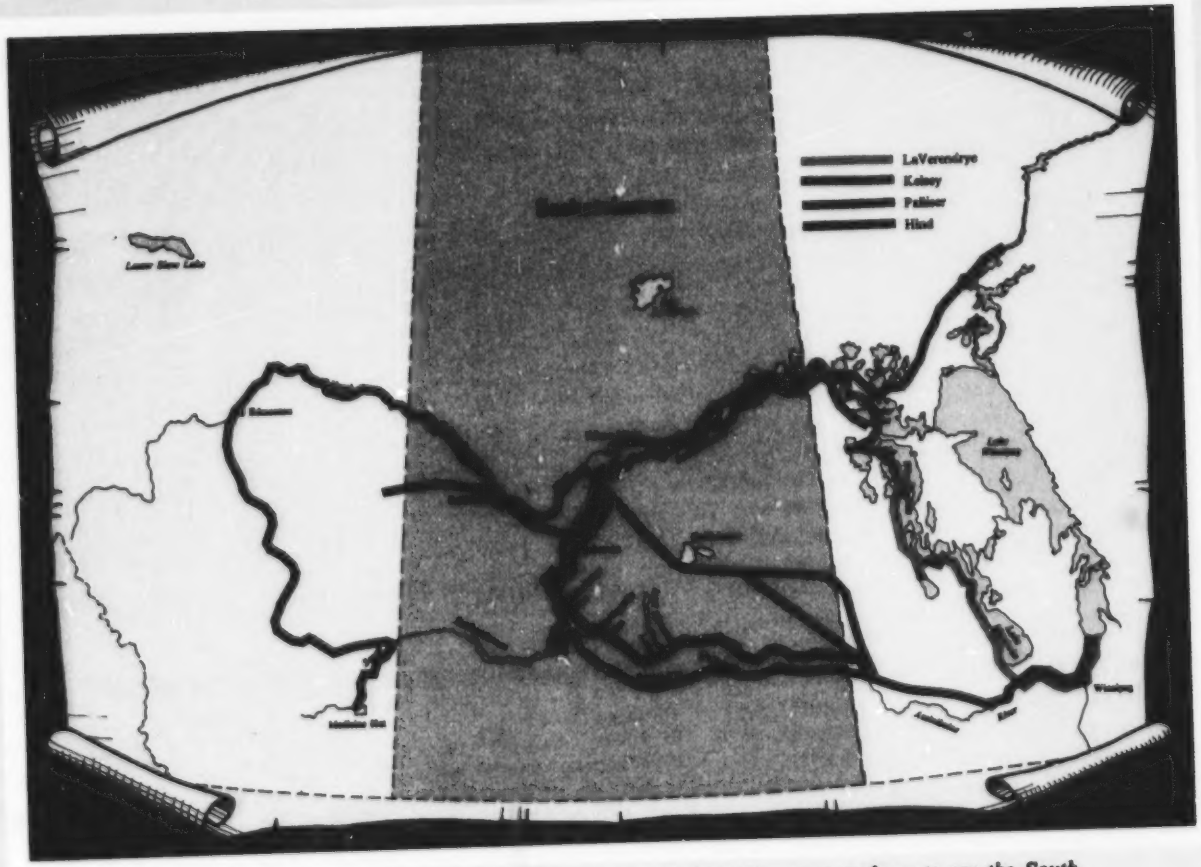
3) An average of 8.4 billion cubic metres of good quality water flows down the river each year.

4) Numerous studies and surveys were undertaken before the most suitable site for the dam was chosen.

4

A century old dream



5) Henry Kelsey of the Hudson's Bay Company was the first European explorer to see the South Saskatchewan River.

The early explorers

It is speculated that Henry Kelsey of the Hudson's Bay Company was the first white man to stand on the banks of the South Saskatchewan River. That was in 1691, when the fur trade was young and the river was called Kisiskatchewan, or swift flowing, by the Indians.

In 1749, Louis-Joseph LaVerendrye reached the fork at which the North and South Saskatchewan Rivers join just east of Prince Albert. Five years later, Anthony Henday reached the Rocky Mountains, tracing the-river-that-flows-swiftly to its source.

Captain John Palliser, a geographer and big game hunter, headed an expedition from Britain to explore western Canada in 1857. A year later, Professor Henry Yule Hind was commissioned to explore the Assiniboine and South Saskatchewan River Valleys.

A dream is born

Both Palliser and Hind noted that the Qu'Appelle River started in a valley 18 kilometres from the elbow of the South Saskatchewan. They envisioned a dam which would divert water from the South Saskatchewan River to the Qu'Appelle River, creating a navigable channel stretching from lower Lake Winnipeg to the Rocky Mountains. The source of the Qu'Appelle was 26 metres higher than the summer level of the Saskatchewan, and the scheme was an ambitious one.

A water transportation route became unnecessary when the Canadian Pacific Railway was built across the prairies in 1882-85. But the railways brought settlers to the drylands, and as their numbers increased, so did the need for secure water supplies. The South Saskatchewan River was destined to play a more vital role on the Prairies than that of a water route.

Between 1901 and 1911 more than 700,000 people swelled the populations of what are now Alberta and Saskatchewan. The population of Moose Jaw grew from 1,500 to 14,000 and Regina grew from 2,300 to 30,000. Many settlers came to farm, or to the small towns. Demands for water began to grow both for urban and agricultural uses.

Numerous engineering studies were commissioned into ways and means to meet these demands. It became evident that water from the South Saskatchewan River would be essential in the future.

6) Anthony Henday traced the South Saskatchewan River to its source in the Rocky Mountains.

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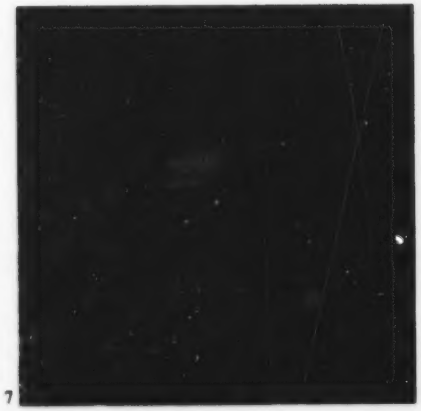

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7) The possibility of using the river as a navigation route was considered by early explorers.

8) Explorers found the river and its sheltered coulees an oasis in the drylands of Saskatchewan.

9) The Canadian Pacific Railway, built in 1882-85, brought many settlers to the prairies.

9

10) Henry Kelsey, Louis-Joseph LaVerendrye, Anthony Henday, Captain John Palliser and Professor Henry Yule Hind all explored the South Saskatchewan River.

Drought a persistent problem

Following his explorations in 1857, Captain Palliser had warned that a vast area of the western plains (later dubbed the "Palliser Triangle"), stretching from the foothills of the Rocky Mountains to what is now southern Manitoba, should be classed as a near-desert, too dry to support normal agriculture. Since the earliest settlement of the area, periodic droughts have indeed plagued its inhabitants. From 1886 to 1890, as little as 200 mm of precipitation fell annually, compared to the normal 400 mm. Again from 1894 to 1897, in 1908, 1910, 1914, and from 1917-21, droughts occurred.

At the turn of the century, the earlier dream of Palliser and Hind was revived in a slightly different form. The federal Department of the Interior began studying the feasibility of damming the South Saskatchewan River to bring water to large areas of Saskatchewan for domestic and agricultural uses. However, this would be a difficult, costly project, and its feasibility could not be proven at that time.

Citizens' groups began to petition government for action. In 1910, at a conference in Regina, the Premier of Saskatchewan acknowledged that water shortages were making mixed farming impossible.

During the 1919-20 session of the Legislature, "an Act respecting a supply of water from the South Saskatchewan River" was passed to deal with the need for more reliable municipal water supplies. A Commission looked into the matter and proposed a pipeline which would cost about $5.5 million. Voters in Regina and Moose Jaw endorsed the idea with enthusiasm, but small communities proposed for service did not, and the idea was dropped.

A dream come true

The most severe and protracted drought ever experienced on the prairies started in 1929 and lasted until 1937. The "Dirty Thirties" were years of dust storms and incredible hardship. An Act establishing the Prairie Farm Rehabilitation Administration (PFRA) was passed by the federal government in 1935. The agency's mandate was to promote soil and water conservation, which included development of dugouts and small dams for domestic use and stockwatering, and community storage projects for stockwatering and irrigation.

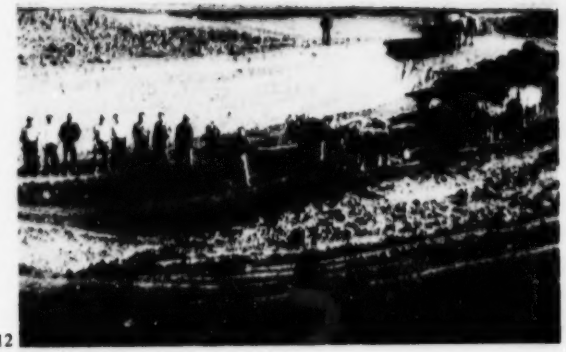
Initially, the organization was fully occupied with a crisis situation. Dugouts and other smaller water conservation schemes were encouraged and constructed, farmers were relocated, blown-out land

11

11) The "Dirty Thirties" brought devastation to the prairies.

12) The Prairie Farm Rehabilitation Administration developed projects such as dugouts and small dams for domestic use and stockwatering.

13) Dugouts and other water conservation schemes were encouraged by the PFRA.



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14) Drought has been a common problem on the prairies. ►

was converted to community pasture. Then, gradually, as the crisis passed, more ambitious projects were undertaken. Larger dams were constructed, irrigation schemes undertaken and community water supplies improved.

In January, 1944, the Honourable James G. Gardiner, Minister of Agriculture in Ottawa, authorized test drillings and revived the dream of a dam on the South Saskatchewan River.

Exploratory drillings by PFRA, at seven sites on a 160 km stretch of the river, revealed an unsatisfactory foundation. Three additional sites were investigated and one was selected as being most suitable. A report dated May 30, 1947, stated that, subject to further detailed studies, a dam could be constructed for about $66.4 million.

Perhaps because the feared post war unemployment failed to materialize, the project was left in abeyance. Then, in 1951, a Royal Commission was appointed to study the proposal. In late 1952, it published its findings which were not entirely favourable to the development. Still, Saskatchewan Premier Tommy Douglas was vitally interested in the project. Also, John Diefenbaker made the undertaking an election campaign promise in 1957, when he formed a minority government. A federal-provincial agreement for developing the project was signed on July 25, 1958, and unanimously approved by parliament on September 1.

On May 27, 1959, an inaugural ceremony marked the start of construction. About 15,000 people attended. Premier Douglas talked of a dam "conceived 100 years ago . . ." Prime Minister Diefenbaker said, "Canada . . . seeks to ensure that there will be less heartbreak and surer hope in this region in years to come." He pulled a lever and a half tonne of dynamite exploded under the earth of the river bottom.

Eight years later, as part of Canada's centennial celebrations, Gardiner Dam, the country's largest earthfill dam, and the smaller Qu'Appelle River Dam, which together impound Lake Diefenbaker, were officially opened at a large public ceremony.

15) Thousands of people turned out to witness the official opening of the South Saskatchewan River Project in 1967.

15

16

16) The opening ceremonies were part of Canada's Centennial celebrations.

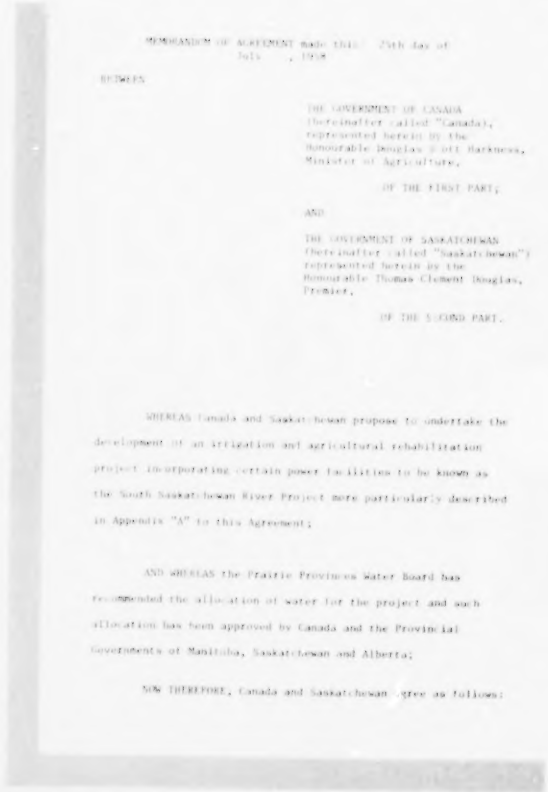
17) One-half tonne of dynamite was exploded under the river bottom during the inaugural ceremony in 1959, which marked the start of construction.

The 1958 agreement between the Governments of Canada and Saskatchewan outlined the basis on which the South Saskatchewan River Project would be planned, constructed and financed.

Federal government responsibility included the design and construction by PFRA of both the Gardiner Dam and the Qu'Appelle River Dam. Together they would create a reservoir that could hold almost 9.4 billion cubic metres of water.

The province would pay 25 per cent of the construction costs up to $25 million, and Canada would pay the rest, which would amount to some $85 million. In addition, provincial agencies would plan, finance and develop the irrigation, hydro power and recreation potential.

The agreement provided that Canada would transfer ownership of the reservoir and the impounding dams to Saskatchewan as soon as they were completed and the reservoir filled. This occurred in April, 1969. However, Canada retained certain responsibilities for maintaining the project. In accordance with the agreement, the South Saskatchewan Reservoir Board was set up to co-ordinate the ongoing operation and maintenance. The board still carries out that responsibility. The federal government is represented on the board by officials from PFRA, while provincial representatives are from the Saskatchewan Water Corporation and the Saskatchewan Power Corporation.



MEMORANDUM OF AGREEMENT made this 25th day of July, 1958

BETWEEN

THE GOVERNMENT OF CANADA (hereinafter called "Canada"), represented herein by the Honourable Douglas Scott Harkness, Minister of Agriculture,

OF THE FIRST PART;

AND

THE GOVERNMENT OF SASKATCHEWAN (hereinafter called "Saskatchewan") represented herein by the Honourable Thomas Clement Douglas, Premier,

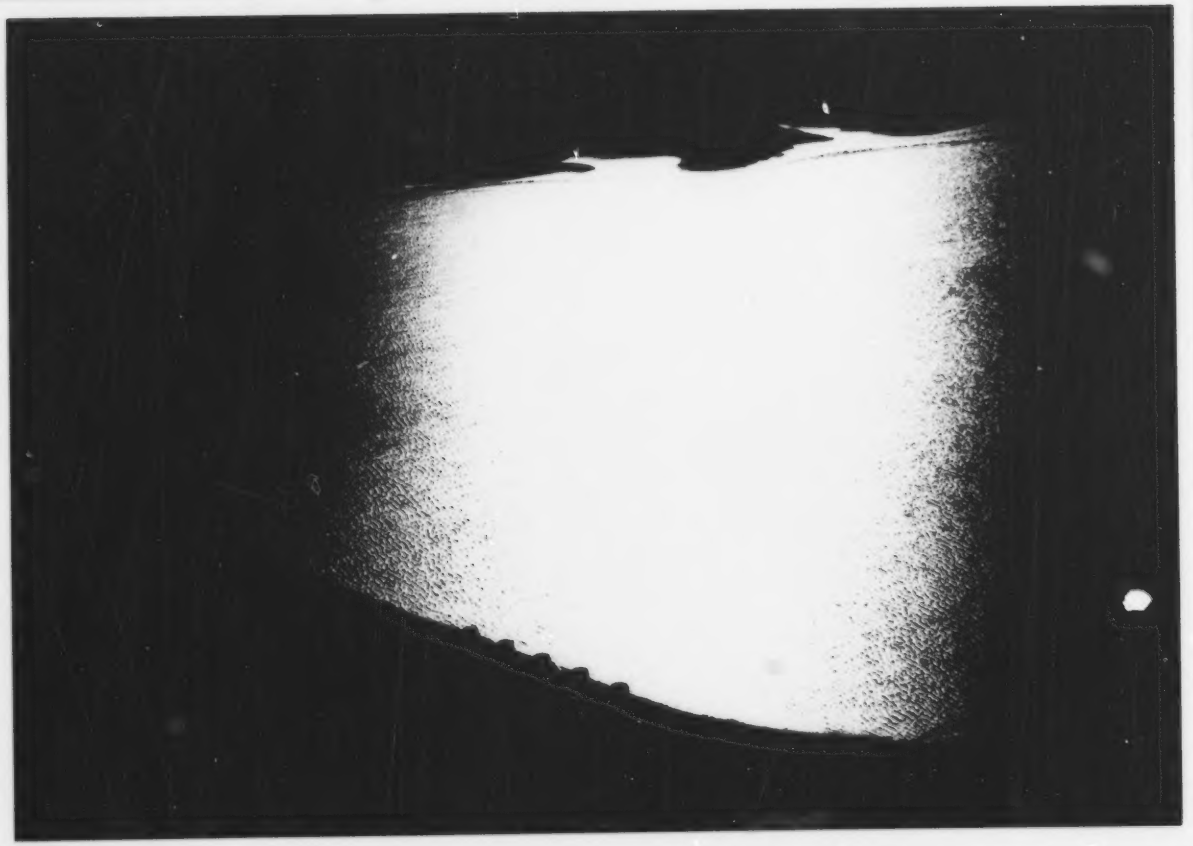
OF THE SECOND PART.

WHEREAS Canada and Saskatchewan propose to undertake the development of an irrigation and agricultural rehabilitation project incorporating certain power facilities to be known as the South Saskatchewan River Project more particularly described in Appendix "A" to this Agreement;

AND WHEREAS the Prairie Provinces Water Board has recommended the allocation of water for the project and such allocation has been approved by Canada and the Provincial Governments of Manitoba, Saskatchewan and Alberta;

NOW THEREFORE, Canada and Saskatchewan agree as follows:

18) The 1958 agreement outlined the basis on which the South Saskatchewan River would be planned, constructed and financed.



19) Gardiner Dam is one of the largest earth fill dams in the world.

Design

When construction of a dam on the South Saskatchewan River was first considered, there was doubt that such a high dam on the river could be economically constructed because of the weakness of the geologically young Bearpaw Shale underlying the area. During the 1940s and early 1950s, foundation drillings and other studies were carried out by PFRA at several sites and an engineering board, comprised of some of the world's foremost engineering consultants, was assembled to provide advice on the project. By the mid-1950s, large earth dams were being developed on apparently similar foundations on the upper Missouri River in the United States. It was decided that such a dam on the South Saskatchewan would be feasible by applying the most recent engineering knowledge in the field.

With the signing of the 1958 agreement between Canada and Saskatchewan, detailed designs for the project were started so construction could begin on the main dam later that year. It was to be one of the largest earth fill dams in the world, and a tremendous engineering challenge.

Construction

Construction of this mammoth project took almost nine years. In the fall of 1958, access roads, headquarters for the PFRA personnel who would supervise construction, and a bridge at the main dam site for transporting equipment and materials across the river were built.

In 1959, work started on the main dam as dozens of large earthmovers began constructing the first two stages of the embankment. Excavated earth was placed and compacted on the east and west sides of the river, narrowing the river channel to half its original width.

Work on the river diversion tunnels began in 1960, as a large mechanical "mole" was brought onsite to excavate five 1.2 kilometre long diversion tunnels. The rotary cutting head of this giant machine bored a hole 7.6 metres in diameter, which was immediately supported by steel ring beams and later lined permanently with concrete 76 cm thick. Three of the tunnels would eventually be used as hydro power penstocks.

By the end of 1963, the tunnels, intakes and control works had been completed. Work was under way on the concrete spillway, and on the Qu'Appelle River Dam 40 km southeast of the main dam. This 27 metre

20) Construction of the embankments was started in 1959.

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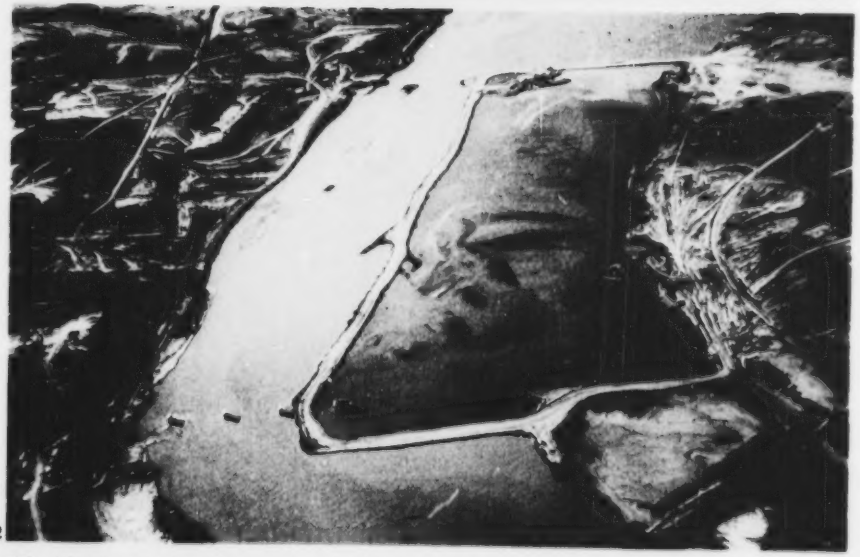
21) Large earth-moving equipment was used to move the massive amounts of earth needed in construction.

21

22) A coffer dam was built to permit dewatering of the embankment area.



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23) A bridge at the main dam site was built to transport equipment and material across the river during construction. ►

high dam was needed to prevent the reservoir water from escaping into the Qu'Appelle Valley. A concrete conduit was installed through the dam permitting the controlled release of water.

In February, 1964, the South Saskatchewan River was diverted from its original channel through the tunnels, and the final stage of the main embankment began. This stage alone required excavating, placing and compacting 26 million cubic metres of earth and harvesting and placing almost 600,000 tonnes of rock riprap to protect the face of the dam.

Major revisions to railway and highway routes, necessitated by creation of the large reservoir, were carried out between 1960 and 1965.

In 1965, construction of the final phase of the massive spillway began. The spillway, which is almost 1.2 kilometres long, required 280,000 cubic metres of reinforced concrete. It is capable of discharging 7,500 cubic metres of water per second.

In 1967, the impounding dams and spillway were completed. The reservoir was well on the way toward being filled for the first time.

The foundations

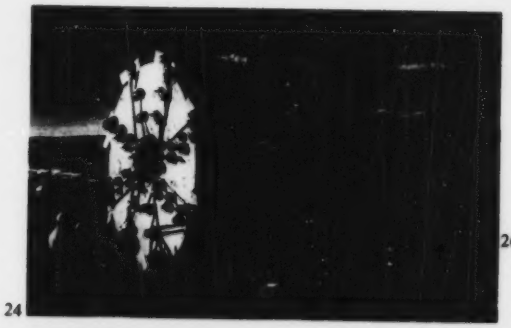
Early in construction of the main dam, when the deep excavations for the embankment foundations were being made, local movement occurred in certain areas of the excavated slopes. This showed the strength of the Bearpaw Shales was lower than originally determined from the investigative drilling, testing and analysis.

Based on this new information, the original designs were revised to further flatten the slopes of the main earth fills and spread the load over an even greater area. The base of the dam would now be nearly two and a half kilometres wide at the highest section. This modification of the design permitted the embankments to be completed successfully and safely, and the reservoir to be put in service on schedule.

To monitor the performance of the project, PFRA engineers installed hundreds of testing devices to measure seepage, pressures and movements, in all parts of the works and deep into the foundation.

One type of device, known as a "slope hole" involved placing a special plastic pipe in a hole drilled into the foundation. A sensitive instrument called a "tiltmeter", when lowered through the pipe, would detect the slightest horizontal movement of material around the hole at any level.

24) A large mechanical mole was used to excavate the five diversion tunnels. 25) Eighty six million cubic metres of earth were excavated for use on the main embankment. 26) Hundreds of testing devices were installed to measure seepage, pressures and movements. 27) Low level intake tunnels were used to divert the river during construction. 28) The spillway crest structure was under construction in 1964. 29) The spillway chute is more than a kilometre long and nearly one-half metre thick.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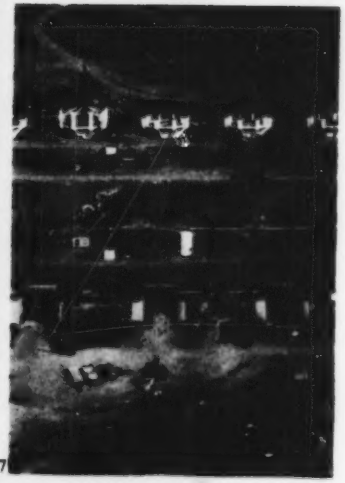
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30) The spillway was constructed to release excess flood waters. ➤

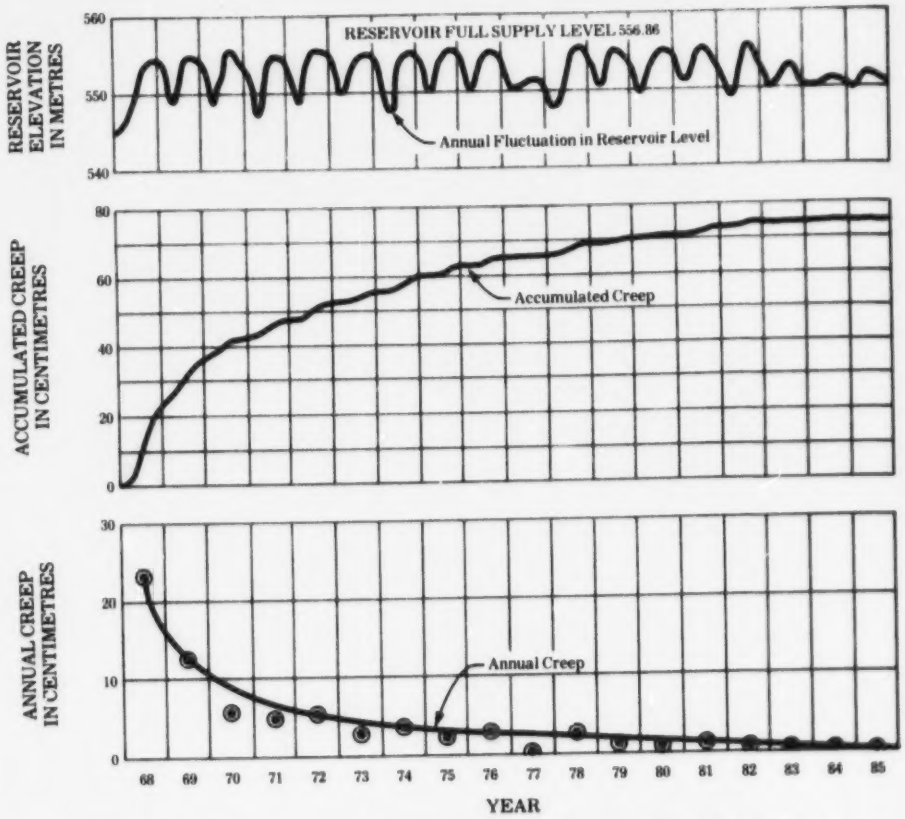
Continued checking of these and other instruments disclosed that as the embankment loading was increasing during construction, the anticipated settlement of the foundations was accompanied by a very slow lateral spread or creep at some depth in parts of the Bearpaw Shale foundation.

Such movements were not unexpected, although the magnitudes were unusually large in some areas. When the embankments were completed, these movements stopped.

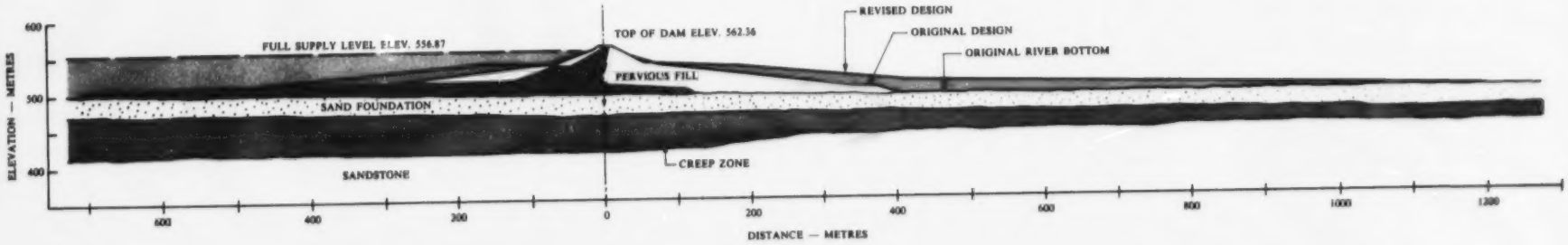
As the reservoir neared its full supply level in 1968, close monitoring of the slope holes showed that the lateral creep beneath the embankment had resumed. Since that time, a small amount of movement has occurred each year as the reservoir fills in the early summer, stopping again as drawdown of the reservoir begins in the fall.

Seepage through the river sands beneath the main embankment has been collected in a system of relief wells and conduits under the downstream toe of the dam. The amount of this seepage has always been well within the predicted values.

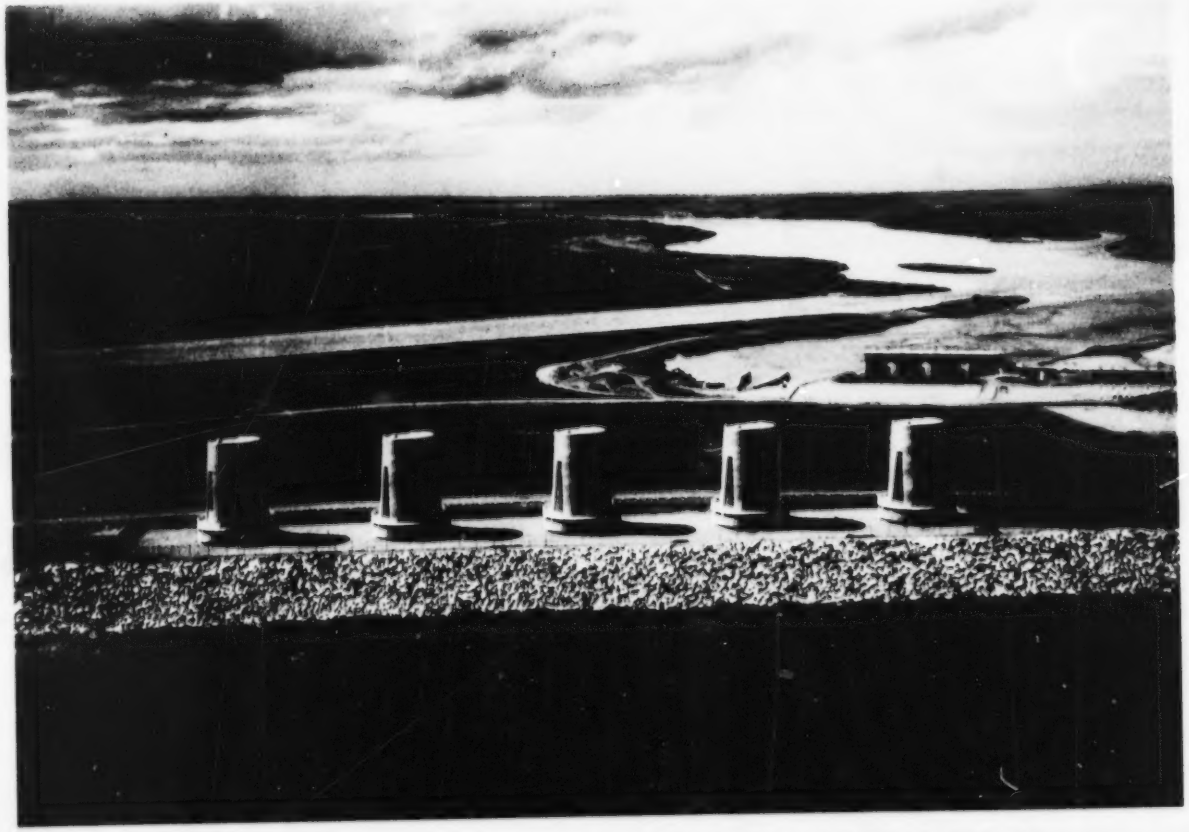
The size of the annual movements in the foundations has steadily decreased since 1968, now amounting to less than two centimetres each year under a dam which is more than 2.4 km wide. Movement under earth dams is normal, and Gardiner Dam is certainly safe. Still the horizontal movements in some foundation areas of Gardiner Dam are greater than occur in most dams, and this interesting phenomenon continues to be observed by engineers so that the performance can be monitored and analyzed, and valuable new knowledge of the Bearpaw Shales obtained.



This chart illustrates the nature of the lateral movements since filling of the reservoir.



Dam cross-section shows revisions to design and location of lateral foundation movements.



31) Construction of the South Saskatchewan River Project took almost nine years to complete.

Irrigation

Southern Saskatchewan's semi-arid climate makes it a natural area for irrigation wherever water is available and soil and topography are suitable. Crop production can be increased and stabilized through irrigation.

When the South Saskatchewan River Project was conceived, vast areas that might benefit through irrigation were identified along the proposed reservoir, in the Qu'Appelle River Basin and in areas northeast and northwest of the project.

To show that irrigation was feasible for a variety of crops and to demonstrate various irrigation methods the PFRA established a demonstration farm at Outlook in 1947 and has operated it since.

Once construction of the project was under way in 1959, Saskatchewan Agriculture began detailed surveys to delineate the irrigation potential and to plan its development. Soil surveys of one million hectares and topographic surveys of over 250,000 hectares were completed. Three main blocks comprising 115,000 hectares as well as small areas totalling about 40,000 hectares were identified as suitable for irrigation.

When PFRA was completing the dams to create Lake Diefenbaker, Saskatchewan Agriculture was constructing the pumping station and main canal to serve the first irrigation district in the Outlook area east of the South Saskatchewan River. By 1967, when filling of Lake Diefenbaker reached a stage so that water was available, the pumps and main canals were ready to begin diverting water to the irrigation district.

In the meantime, Saskatchewan Agriculture had constructed the distribution and drainage works needed to serve the first irrigation district. In addition, a program of assistance to on-farm irrigation development was initiated. Staff were located in Outlook to help the farmers in the area plan efficient, economic irrigation projects.

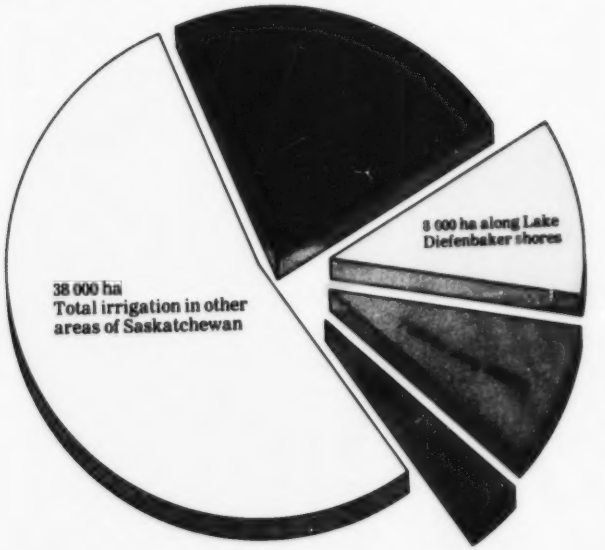
The transition from dryland farming did not take place immediately. While some farmers converted rapidly, others developed irrigation by stages and some chose not to convert from traditional dryland farming.

By the end of 1985, about 33,000 hectares of farmland were under irrigation from Lake Diefenbaker. This area included 16,000 hectares in Irrigation District No. 1 at Outlook, 10,000 hectares in other projects around Lake Diefenbaker and 7,000 hectares along the Saskatoon Southeast Water Supply System (SSEWS).

Intensive Irrigation in Saskatchewan

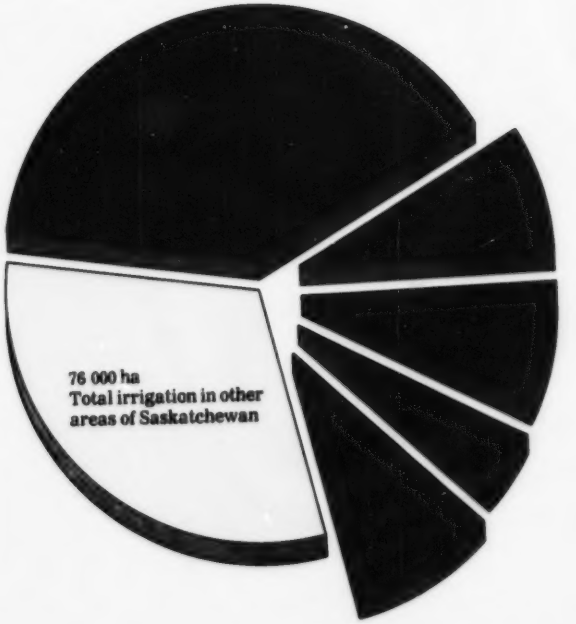
1985 Development

(Total 71 000 hectares)



Potential Development
(by the year 2030)

(Total 250 000 hectares)



32) Irrigation projects allow farmers to grow a variety of new crops. ►

The Saskatchewan Water Corporation operates and maintains a major pumping plant on the east side of the lake and related water delivery works which supply water to Irrigation District No. 1 and the SSEWS development.

Irrigation expands the opportunitites for crop diversification and continuous cropping. Besides the traditional wheat and barley crops, alfalfa, soft white wheat, rapeseed, flax, corn, potatoes and some other horticultural crops are produced.

With the diversity of crops comes secondary business opportunities. The Town of Outlook, located in the centre of the irrigation area, has become a major agricultural supply and irrigation equipment distribution centre.

Power from the South Saskatchewan River

The possibility of harnessing the flow of the Saskatchewan River system for hydroelectric generation has been recognized since the turn of the century. The South Saskatchewan River Project changed this possibility to a reality by creating the hydrostatic head and water storage for hydroelectric power generation.

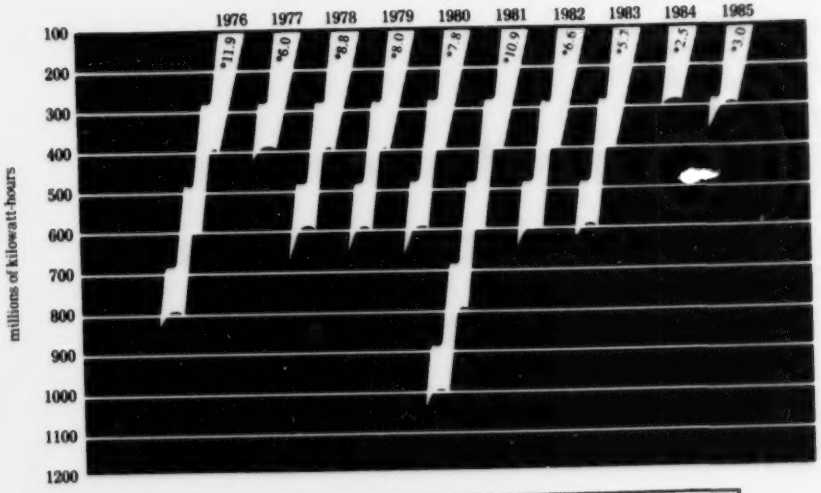
To harness this power the Saskatchewan Power Corporation built the Coteau Creek Hydroelectric Station at Gardiner Dam.

Three of the tunnels, that were originally built to divert the river during dam construction, were converted to penstocks for the Coteau Creek Hydroelectric Station. These tunnels are lined with steel and carry the water from the lake to the hydraulic turbines which power the electric generators.

The 187,500 kilowatt power station has been in operation since December, 1968. It produces an average of 775 million kilowatt hours of energy each year. By storing the high summer flows of the river for power production in the winter, the majority of this energy is available in the high energy demand months from November to March.

Flow regulation at Lake Diefenbaker has improved the feasibility of downstream power stations. For example, the Squaw Rapids station on the Saskatchewan River near Nipawin only generated 20 per cent of its annual output in the winter prior to Lake Diefenbaker. Now it produces over 40 per cent in this critical period of the year.

Coteau Creek Power Generation



1969-75 Coteau Creek Power Generation
(millions of kilowatt-hours)

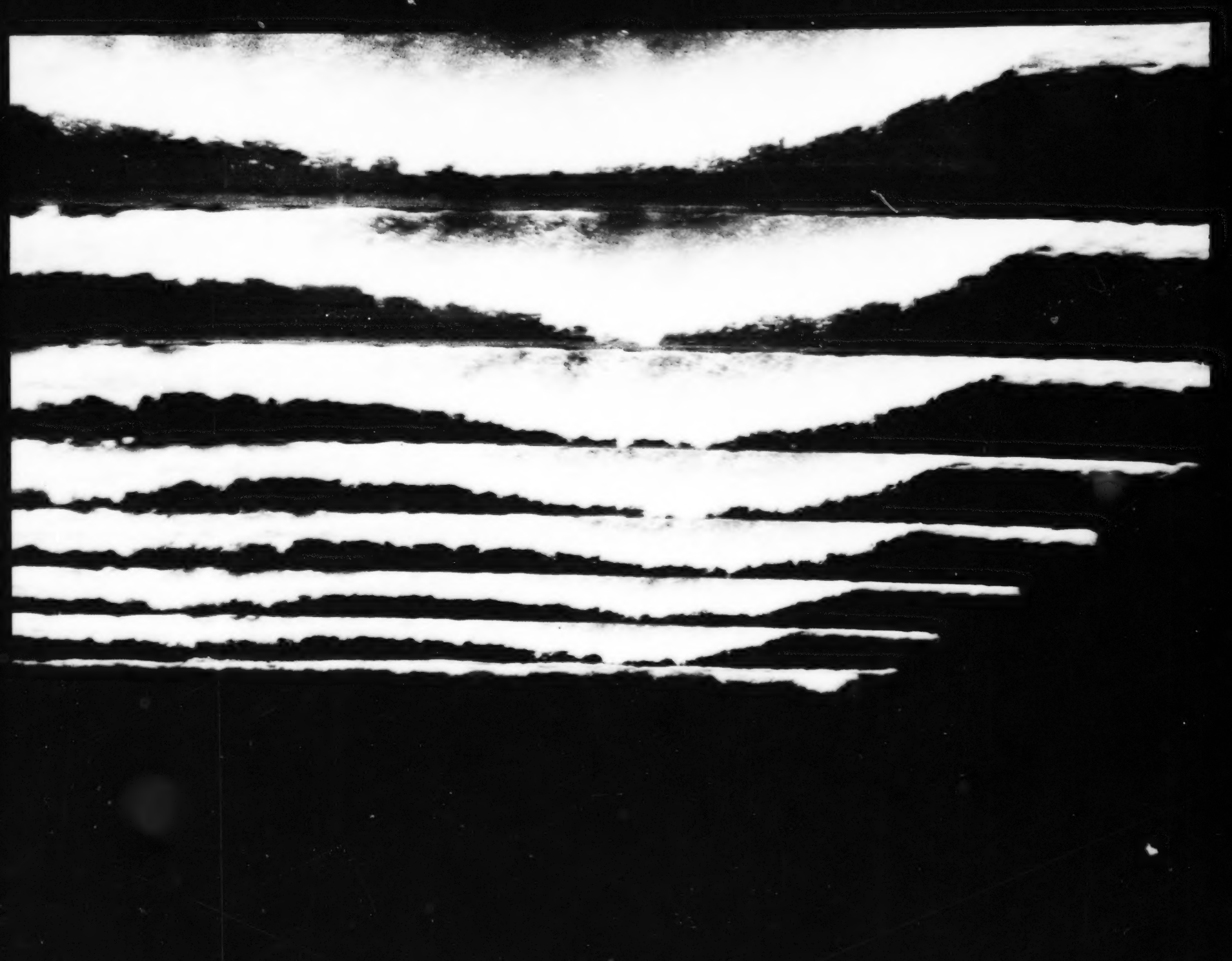
1969	1970	1971	1972	1973	1974	1975
1123	823	900	1131	733	1074	978
*23.7	*15.4	*16.0	*18.7	*10.7	*15.7	*14.8

*Percentage of provincial total electrical energy generated.

1969-75 Water Use for Power Generation
(billions of cubic metres)

1969	1970	1971	1972	1973	1974	1975
9.2	6.7	7.2	8.9	5.7	8.3	7.5

33) Release of water over the spillway is minimized to conserve water for power and other uses.



Municipal and industrial water uses

Lake Diefenbaker is some distance from the major urban and industrial areas of Saskatchewan so it was necessary to build a canal and pipeline system to utilize this source of good quality water.

In 1966 the Saskatchewan Water Supply Board, a provincial Crown Corporation, was established to develop a multi-purpose water supply system southeast of Saskatoon. The Board's property and works were transferred to the Saskatchewan Water Corporation in 1984 and are operated as a Utility Branch of the Corporation.

The Saskatoon South East Water Supply (SSEWS) system is comprised of five reservoirs with interconnecting canals and pipelines to distribute water from Lake Diefenbaker. Municipal water customers include the communities of Hanley, Viscount, Guernsey and Lanigan as well as the Resort Villages of Thode and Shields. The major industrial use is in the production of potash and three potash mines are supplied from the SSEWS system. Irrigation, waterfowl breeding and recreation projects are also served. Irrigation is the largest user with a potential development of 9000 hectares of which 7000 hectares have been developed.

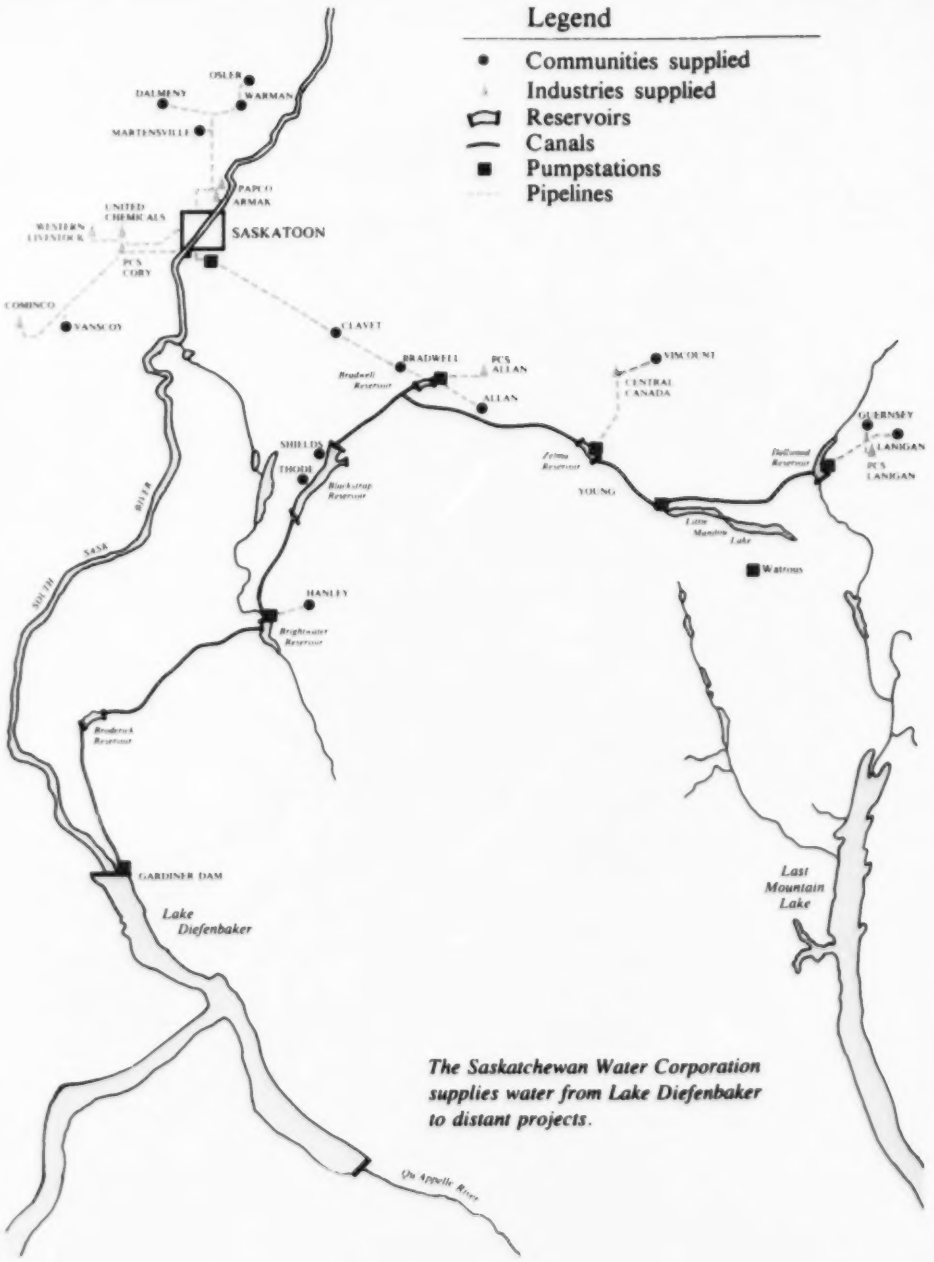
Water from Lake Diefenbaker also serves municipal and industrial users in the Qu'Appelle River Basin. The Qu'Appelle River Dam includes a controlled outlet which permits release of water from Lake Diefenbaker into a channel in the Qu'Appelle River Valley leading to Buffalo Pound Lake. Buffalo Pound Lake is the source of all of the municipal water for Moose Jaw and most of the water used at Regina. It also supplies the Kalium Chemicals Potash Mine at Belle Plaine.

Wildlife and fisheries

The formation of Lake Diefenbaker converted about 42,000 hectares of the South Saskatchewan River valley into a lake. This resulted in significant changes for the wildlife and fish of the region.

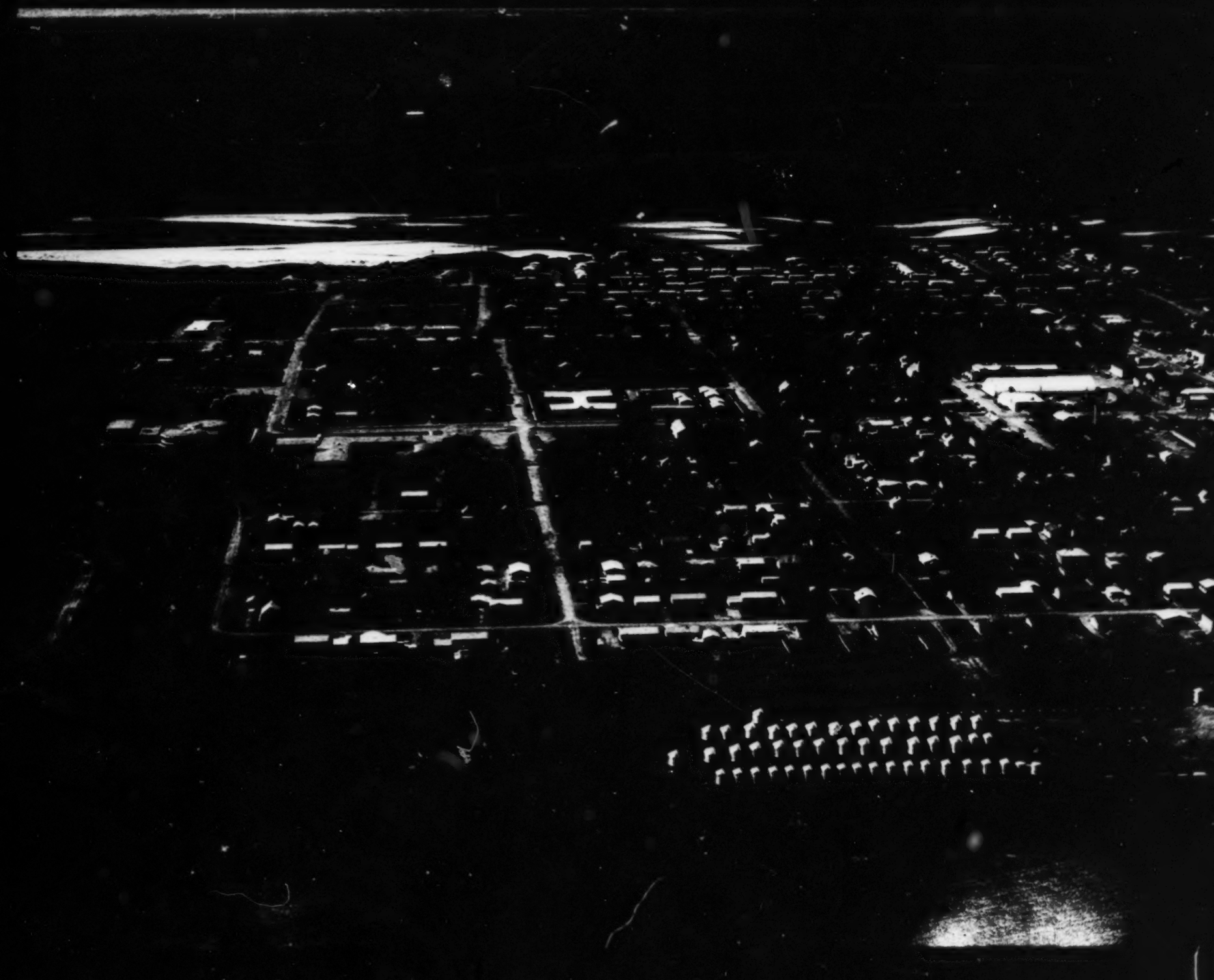
The habitat for upland animals including deer, birds, rodents and predators was flooded while the habitat for fish and waterfowl was expanded.

Waterfowl have been very successful in taking advantage of this new large lake as a staging area during their annual migrations across the prairies.



The Saskatchewan Water Corporation supplies water from Lake Diefenbaker to distant projects.

34) Outlook is one of many communities that benefit from the South Saskatchewan River Project.



Saskatchewan Tourism and Renewable Resources carried out fish stocking programs in 1969 and 1975. Millions of walleye, whitefish and lake trout were introduced making Lake Diefenbaker a popular fishing spot. In addition to the stocked fish, the lake contains northern pike, perch, rainbow trout, goldeye, sauger and sturgeon; all of which are native to the river.

These fish have prospered in their new home. The lake now contains a huge walleye population — Saskatchewan's most sought-after game fish. Lake Diefenbaker may be second only to the Qu'Appelle Lake chain in terms of walleye-producing capability in Saskatchewan. The lake also supports a commercial fishery for whitefish with 91,000 kg harvested annually.

Shoreline development controls

The wide variety of slopes, soils and foundation conditions limit the amount of potentially usable waterfront at Lake Diefenbaker. In 1962 the lands around the lake were designated as a Reservoir Development Area and regulations were established to assure proper use of the shoreline.

Most of the land around the lake is agricultural. Since this is its best use, it has been designated to remain in that use. Areas with favourable slopes and soil conditions have been designated for recreational development.

Under the regulations administered by Saskatchewan Environment, development permits must be obtained before land use changes can take place. Development plans are reviewed by Saskatchewan Environment to assure environmental quality is maintained or enhanced. The regulations assure safe and orderly development and prevent damage from flooding, erosion or land slides. They also ensure that development which might interfere with the efficient operation of the reservoir is avoided.

Tourism and recreation

Lake Diefenbaker with a large surface area and nearly 800 kilometres of shoreline provides great opportunity for high quality water based recreation. The potential for new and expanded recreational developments in the area has long been recognized by the provincial government. A long term strategy for both private and public sector involvement in that development is now in place and is resulting in improved facilities and greater utilization of the resource.

Three provincial parks; Douglas Park near Elbow, Danielson Park at Gardiner Dam and Saskatchewan Landing Park north of Swift Current have been established on Lake Diefenbaker. In addition, local municipalities have developed four regional parks on the lake. Increasing public awareness of the parks has resulted in a steady growth in use.

35) An information centre at Gardiner Dam and the Coteau Creek Hydroelectric station provide colourful displays and information on the project.

35

36) Douglas Provincial Park is one of many recreation areas developed near Lake Diefenbaker and other reservoirs along the system.

37) Lake Diefenbaker, created by the dam, provides opportunities for swimming and other water sports.

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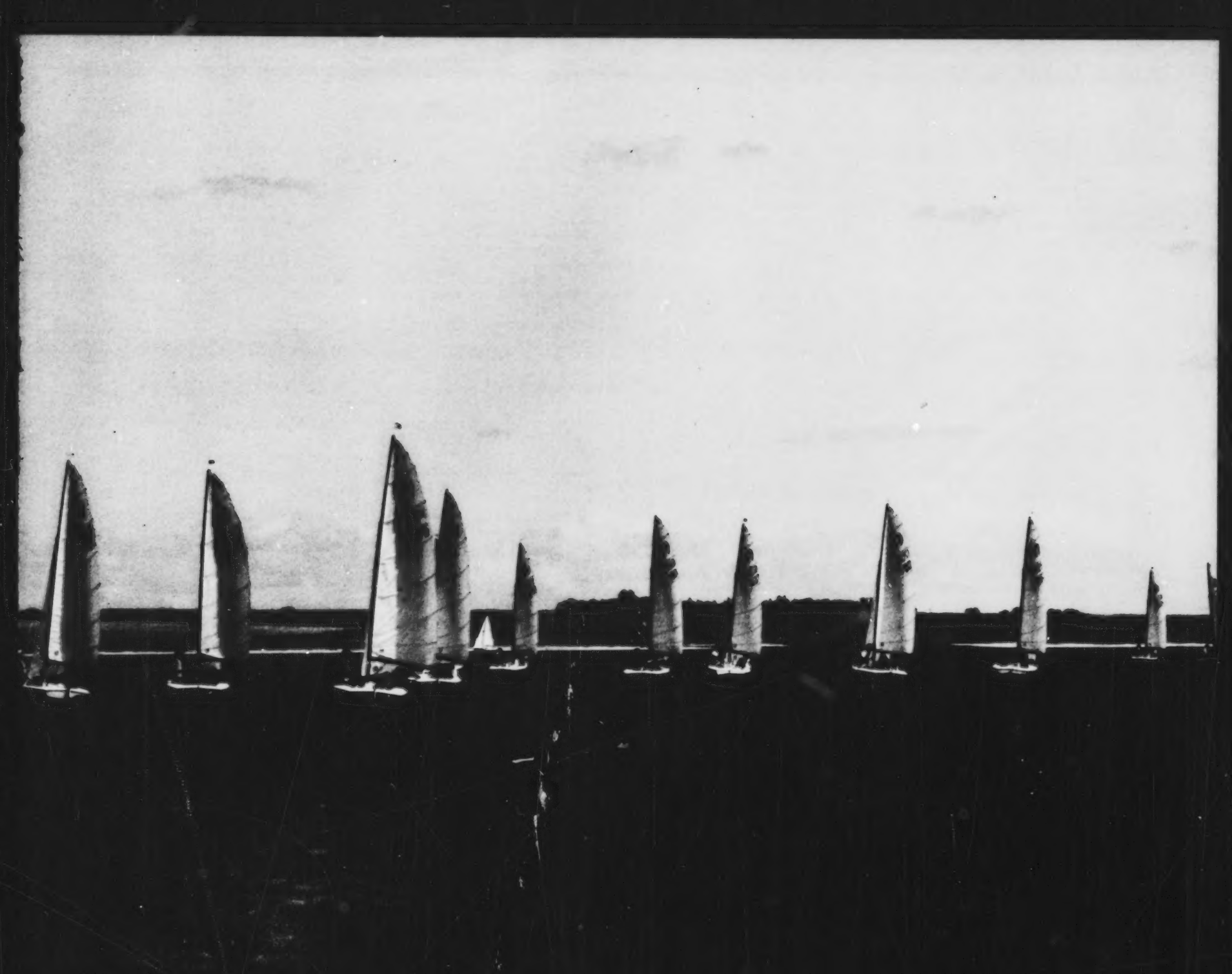
38) Sailing is a popular activity on Lake Diefenbaker. ➤



For those wishing to use the lake as a regular summer resort, cottage subdivisions have been carefully planned and developed.

Boaters and sailors find the lake ideal because of its great length and overall size. All provincial and regional parks on the lake now provide modern boat launches. At Elbow harbour on-going improvements and development of the launching and docking facilities are turning it into an extremely popular attraction.

The water supply systems that use Lake Diefenbaker as a source also have included recreation projects. Blackstrap Lake, enhanced by imported Lake Diefenbaker water, has greatly increased recreation opportunities near Saskatoon. The lakes in the Qu'Appelle Valley near Regina, Moose Jaw and Fort Qu'Appelle have also been improved for recreation by water from Lake Diefenbaker.

Flow regulation

In order to use the storage capabilities of Lake Diefenbaker to supply all users, the lake level is varied each year and downstream flows are regulated.

In the spring and summer water is stored in Lake Diefenbaker. The following winter, the water is released to produce power. The lake regularly rises and falls 3-9 metres each year.

The variations of flow in the river downstream of the project have been greatly reduced. Flooding is less common and less extreme.

Planning the operation of the reservoir is a continuing activity. Upstream flows and snow conditions in the Rocky Mountain headwaters are monitored and operation plans are adjusted to make sure all users get the maximum benefit from the water.

Except during very brief and infrequent periods when large flood flows may require water to be released over the spillway at Gardiner Dam, all the water entering Lake Diefenbaker is used. Although the consumptive uses are very important, they only take about six per cent of the total flow of the South Saskatchewan River. The remaining 94 per cent of the flow is used to generate electricity and then is passed downstream.

39) Numerous waterfowl projects receive water from the South Saskatchewan River project.

40) The healthy fish populations of Lake Diefenbaker provide excellent angling opportunities.

41) The flow of the river is regulated to reduce flooding and enhance hydro generation.

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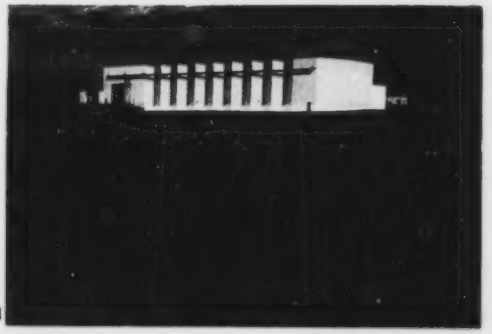

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42) Unique sand dunes provide an attraction to visitors.

42

In its first decade the South Saskatchewan River Project achieved many of its planned objectives but its potential for the future is nearly unlimited.

Irrigation of about 33,000 hectares of land has resulted in improved land productivity and increased economic activity in the farm community. By realizing the additional potential, irrigation will permit this prosperity to expand into the future. Secondary industries for processing, packaging, storing and shipping of the new high value crops will be supported by this expanded and diversified agricultural industry.

Although virtually all the hydroelectric energy available at Lake Diefenbaker is utilized by the Coteau Creek Hydroelectric Station, there are opportunities for expanding the generating capacity to make this energy available when demands are high and alternative energy sources are expensive. There are also opportunities to construct hydroelectric projects downstream of Lake Diefenbaker to utilize regulated flows .

Harnessing the South Saskatchewan River has assured an adequate supply of water for municipal and industrial growth at Regina, Moose Jaw and in the area served by the Saskatoon Southeast Water Supply System. In the future water delivery systems based on the project will be expanded to other areas of Saskatchewan.

The recreation potential of this large lake in an otherwise arid area has only begun to materialize. As this new lake carves beaches out of the valley slopes, recreation facilities will be expanded, and its value as a resort area will increase. The closeness of Lake Diefenbaker to major population centres and travel routes and pressure on other southern Saskatchewan resort areas give it outstanding potential.

As the forces of nature adapt to the new environment, wildlife and fish populations have increased. Man-made wildlife projects using Lake Diefenbaker water have been developed and existing projects expanded to provide managed waterfowl breeding grounds. Wildlife remote from the lake has also benefited.

Some man-made reservoirs on silt laden rivers have filled with sediment before their full potential was achieved. This possibility was considered in the design of Lake Diefenbaker and continuing measurements of sediment build up are carried out. It will take many hundreds of years before sediment affects the usefulness of this lake so it is not a limiting factor on development.

The South Saskatchewan River Project was a dream that lasted a century. It now stands as a functional monument to the foresighted people who saw and fulfilled that dream.

44) The spillway protects the dam in major floods.

44

45) Irrigation provides a more secure lifestyle for farmers in southern Saskatchewan.

46) Recreation areas provide many opportunities for fishing and boating.

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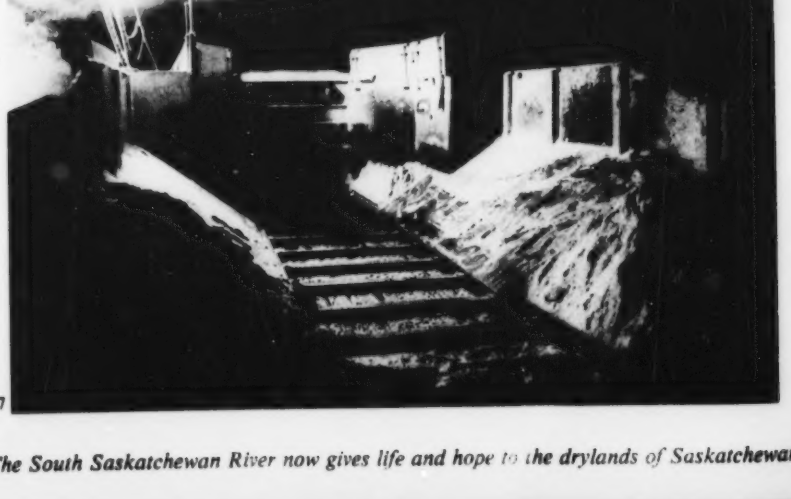
47) A number of potash mines receive their water from the South Saskatchewan River Project.



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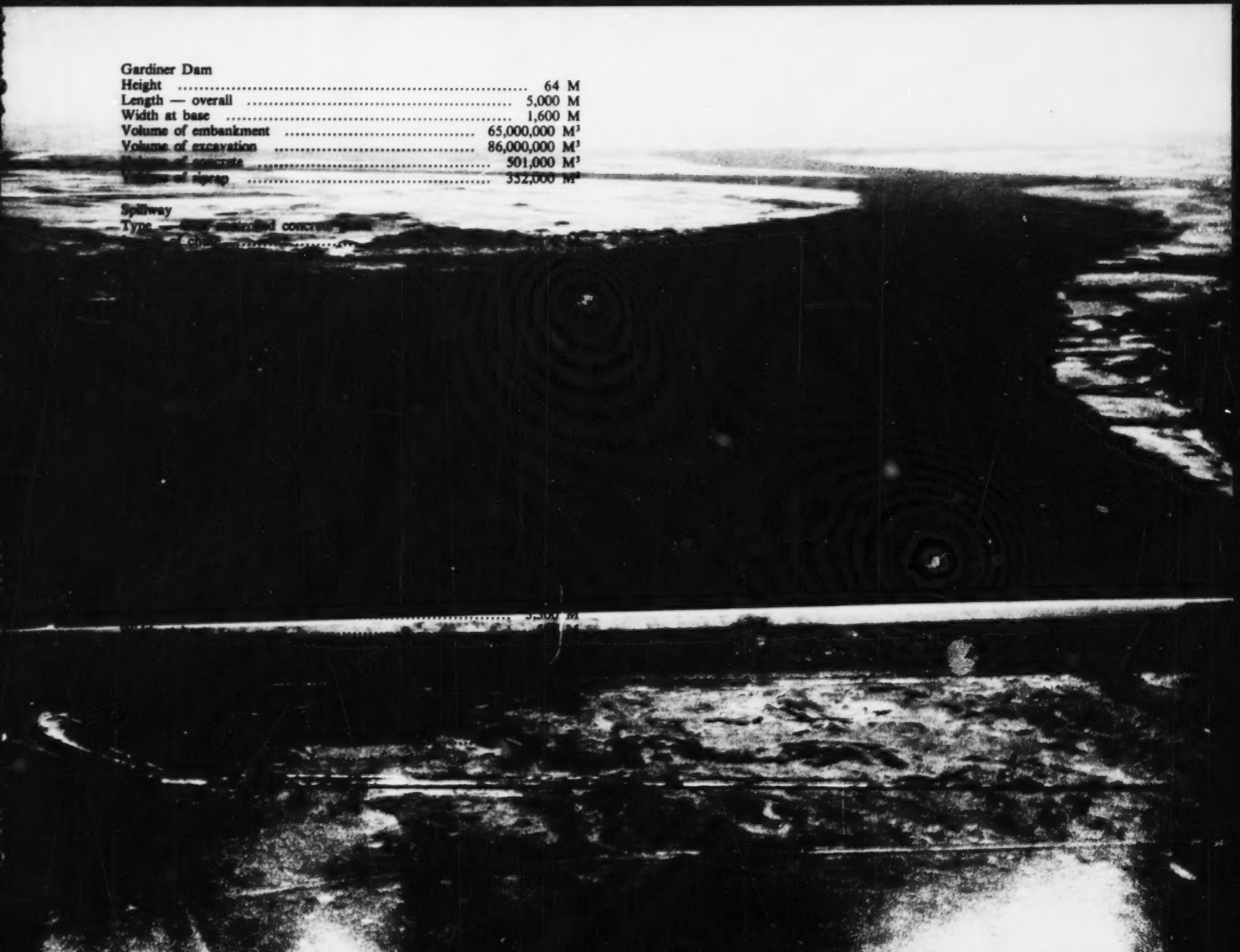
48) The South Saskatchewan River now gives life and hope to the drylands of Saskatchewan.

43) The South Saskatchewan River Project provides irrigation, power, recreation, flood control and urban water supplies.


Gardiner Dam
Height ..... 64 M
Length — overall ..... 5,000 M
Width at base ..... 1,600 M
Volume of embankment ..... 65,000,000 M³
Volume of excavation ..... 86,000,000 M³
Volume of concrete ..... 501,000 M³
Volume of riprap ..... 332,000 M³
Spillway
Type
Number of chute 3

Government of Canada
Agriculture Canada
PFRA

SASKATCHEWAN
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CORPORATION